Teachers' Retirement System, State of Montana actuarial evaluation as of July 1

TEACHERS' RETIREMENT SYSTEM

STATE OF MONTANA

ACTUARIAL VALUATION

AS OF

JULY 1, 1975

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INTRODUCTION

In accordance with Chapter 62, Section 75-6205 of the Teachers' Retirement Law, an actuarial valuation of the Teachers' Retirement System of the State of Montana has been completed. The purpose of this valuation was to determine the position of the fund, the normal cost, and the unfunded accrued liability based on present and prospective assets and liabilities of the System as of July 1, 1975.

The valuation was based on employee data and other records maintained by the System as of June 30, 1975, and incorporates all amendments of the Retirement Law as of July 1, 1975.

This report presents the results of the valuation.

Actuarial Certification

Based upon the assumptions stated herein and the data maintained by the Teachers' Retirement System, the actuarial valuation has been performed in accordance with generally accepted actuarial principles and techniques.

Alton P. Hendrickson
Associate of the
Society of Actuaries

METHOD OF FUNDING

The Method of Funding employed is commonly referred to as the "entry-age normal cost method". This method establishes a "normal cost" for each member as well as an unfunded accrued liability. The annual normal cost is the level percentage of annual salary required to fund the benefits assuming this percentage had been contributed since the member's entry into the System.

The unfunded accrued liability represents the liability for accrued benefits which has not been previously funded. This liability can arise from four sources:

(1) If the member began teaching prior to the establishment of the System (1937), and thus did not contribute during the prior years;

(2) If the member received additional credit which was not funded or only partially funded, such as military service and out-of-state teaching credit;

(3) If benefits were increased for which no funding had been previously made;

(4) If actuarial losses were incurred when actual experience varied from expected experience.

In order to maintain the System on an actuarially sound basis, the total rate of contribution should be such as to meet the normal costs in addition to making progress towards the amortization of the unfunded accrued liability.

Actuarial Assumptions

Since the true cost of the retirement plan will be directed by its own experience, certain assumptions must be made as to the expected experience. The following is a summary of the assumptions used in the valuation:

Mortality Rates

The mortality rates for males and females are based upon a published table referred to as the 1951 Group Annuity Mortality Table projected to 1965.

Rates of Mortality

Age	Female	Male
25	.042%	.064%
30	.056	.083
35	.078	.115
40	.112	.168
45	.167	.300
50	.257	.543
55	.390	.875
60	.657	1.304
65	1.140	2.048
70	1.937	3.296
70	3.849	5.423
80	6.752	9.077
85	10.720	14.015
90	16.433	20.059

Disability Rates

The disability rates for males and females are based upon the male ordinary disability rates published by the Railroad Retirement Board in its eighth valuation.

Rates of Disability

Age	Female	Male
25	.015%	.015%
30	.015	.015
35	.020	.020
40	.045	.045
45	.095	.095
50	.170	.170
55	.310	.310

Withdrawal Rates

The withdrawal rates are based upon the actual experience of the Teachers' Retirement System during 1966-71 with an adjustment for an anticipated decrease in withdrawals in future years.

	Rates of Withdrawal	
Age	Female	Male
25	24.47%	20.58%
30	21.16	12.25
35	15.00	9.07
40	10.20	8.28
45	6.76	7.07
50	4.68	5.44
55	2.96	3.38
60	1.94	2.05

Salary Scale

The rates of salary increase are based upon a study conducted in 1975 on base salary increases by age as a result of longevity. In addition to the base increases, an inflationary increase of 5% per annum is assumed.

	Expected Final Salary at Age 60 As a Multiple of Current Salary	
Age	Female	Male
20	12.07	10.59
25	8.22	7.39
30	5.53	5.12
35	3.92	3.70
40	2.89	2.78
45	2.18	2.13
50	1.66	1.65
55	1.28	1.28
60	1.00	1.00

Retirement Rates

The rates of retirement are based upon the actual experience of the Teachers' Retirement System during 1966-71.

	Rates of Retirement	
Age	Female	Male
60	12.0%	11.0%
61	13.0	11.0
62	13.0	11.0
63	13.0	12.0
64	13.0	13.0
65	13.0	14.0
66	10.0	11.0
67	6.0	8.0
68	4.0	5.0
69	2.0	3.0
70	1.0	1.0

Investment Earnings

An annual rate of 6¼% is assumed for future investment earnings.

Expenses

Administrative expenses are to be paid from membership fees and excess investment income.

Assets

The security investments are valued at amortized book value. The real estate mortgages are valued at full principal value.

ANALYSIS OF VALUATION

As a result of the valuation which was conducted as of July 1, 1975, we have concluded that the Montana Teachers' Retirement System is funded on an actuarially sound basis. The present contribution rate of 12.375% of salaries is sufficient to finance the cost of benefits as they accrue in the future as well as to amortize the current unfunded liability over a period of 46 3/4 years.

Effective July 1, 1975, the years of service required for full benefits were reduced from 35 years to 30 years. This legislative change significantly increased the liabilities of the System. To finance these additional liabilities, the statutory contribution rates were increased from 10.375% of salaries to 12.375% with an employer rate of 6.250% and an employee rate of 6.125%. This valuation has determined that the additional contribution of 2% of salaries was sufficient to support the additional liabilities.

A study was conducted in 1975 to determine the actual salary increases by age as a result of longevity. From this study, a relative scale of salary increases was developed and incorporated in this valuation. Further, it was assumed the rate of future inflationary increases would be 5% per annum. This rate of inflation was added to the salary increase rates due to longevity. The result of the revised salary increase assumptions was an increase in the liabilities of the System. The employer and member contributions to the System are determined as a percentage of salary. Because of the larger salaries projected in the future, the contributions are also projected to be larger. The cost of the additional liabilities were largely offset by these larger contributions expected in the future.

In addition to the legislative change and assumption revisions noted above, increases in current benefits and salaries of active members were also instrumental in increasing the liabilities of the System. The changes which have taken place since the July 1, 1973 actuarial valuation are illustrated on Schedule V, page 11.

SCHEDULE I

NORMAL COST ALLOCATION

	Contribution Rate		
	Female	Male	Total
Retirement	5.814%	4.763%	5.162%
Death	.412	.782	.641
Disability	.221	.238	.232
Vested	1.179	1.304	1.256
Return of Contribution	1.497	1.656	1.595
Total	9.123%	8.743%	8.886%

(1)	Present Value of Future Salaries of Present Members	$1,510,565,711
(2)	Normal Cost Contribution Rate	8.886%
(3)	Present Value of Future Normal Costs for Present Members ((1) x (2))	$ 134,228,869

SCHEDULE II

UNFUNDED ACCRUED LIABILITY ALLOCATION

(1)	Present Value of Benefits (Schedule III)	$456,976,945
(2)	Present Value of Future Normal Costs (Schedule I)	134,228,869
(3)	Trust Fund Assets (Schedule IV)	103,403,027
(4)	Unfunded Accrued Liability ((1)-(2)-(3))	$219,345,049

Amortization over 40-year Period

(5)	Present Value of Salaries of Members During next 40 Years	$5,579,603,500
(6)	Unfunded Accrued Liability Contribution Rate ((4) by (5))	3.931%
(7)	Normal Cost Contribution Rate (Schedule I)	8.886
(8)	Required Contribution Rate	12.817%

Current Period of Amortization (46 3/4 Years)

(9)	Present Value of Salaries of Members During Next 46 3/4 Years	$6,287,074,600
(10)	Unfunded Accrued Liability Contribution Rate ((4) by (9))	3.489%
(11)	Current Contribution Rate ((7) + (10))	12.375%

SCHEDULE III

ACTUARIAL BALANCE SHEET

Assets:

(1)	Trust Fund	$103,403,027	
(2)	Present Value of Future Contributions for Unfunded Accrued Liability	219,345,049	
(3)	Present Value of Future Contributions for Normal Costs	134,228,869	
Total Assets			$456,976,945

Liabilities:

(1)	Present Value of Benefits - Inactive Members		
	(a) Retirement	$ 83,233,691	
	(b) Death	4,258,987	
	(c) Disability	4,781,358	
	(d) Vested	4,214,678	
	(e) Dormant	1,134,720	
	(f) Tax-Sheltered Annuities	153,834	
	(g) Excess Interest Payment	33,072	
			$ 97,810,340
(2)	Present Value of Benefits - Active Members		
	(a) Retirement	$238,041,050	
	(b) Death	29,200,855	
	(c) Disability	9,774,462	
	(d) Vested	41,234,860	
	(e) Return of Contributions	39,236,938	
	(f) Legacy Fund	18,879	
	(g) Supplemental Benefits (Tax-deferred Annuities)	1,659,561	
Total Liabilities			$359,166,605
			$456,976,945

SCHEDULE IV

SUMMARY OF FUND OPERATION

Trust Fund as of July 1, 1974		$ 94,343,498
Receipts:		
Employer Contributions	$ 7,107,370	
Employee Contributions	7,502,203	
Net Investment Income	6,456,664	
		21,066,237
Disbursements:		
Benefit Payments	10,243,903	
Withdrawal Refunds	1,572,928	
Operational Expenses	189,877	
		12,006,708
Trust Fund as of June 30, 1975		$103,403,027

SCHEDULE V

COMPARISON SUMMARY

	Fiscal Year Ended 1973	Fiscal Year Ended 1975
Present Value of Benefits	$ 250,323,644	$ 456,976,945
Present Value of Normal Costs	$ 53,789,342	$ 134,228,869
Unfunded Accrued Liability	$ 112,189,085	$ 219,345,049
Active Members		
Number of Lives	12,089	14,373
Annual Payroll	$ 124,250,621	$ 174,958,880
Inactive Members		
Number of Lives	2,899	3,338
Monthly Benefits	$ 646,108	$ 828,653
Contributions Based on Payroll		
Employer	$ 6,523,158	$ 10,934,930
Employee	$ 6,367,844	$ 10,716,231
Assets	$ 84,345,217	$ 103,403,027
Investment Income	$ 4,778,661	$ 6,456,664

SCHEDULE VI

SUMMARY OF ACTIVE MEMBERS

Females

Nearest Age	No.Of Lives	Average Service at Ret.	Average Current Salary	Average Projected Benefit
- 24	1124	37.63	$ 8,596	$3,912
25 - 29	1482	36.05	9,529	3,272
30 - 34	1008	33.50	10,897	2,549
35 - 39	741	31.31	11,258	1,867
40 - 44	623	29.41	11,325	1,406
45 - 49	587	27.13	11,850	1,069
50 - 54	515	25.29	12,208	796
55 - 59	668	24.43	12,126	594
60 - 64	396	23.62	12,508	502
65 -	43	20.74	11,427	421
	7187			

Males

Nearest Age	No.Of Lives	Average Service at Ret.	Average Current Salary	Average Projected Benefit
- 24	414	37.40	$ 9,088	$4,562
25 - 29	1271	35.51	10,243	3,683
30 - 34	1598	33.47	12,185	3,012
35 - 39	1192	32.08	14,264	2,515
40 - 44	952	31.05	15,563	2,022
45 - 49	671	30.14	16,430	1,583
50 - 54	570	29.46	17,169	1,243
55 - 59	336	28.13	17,779	961
60 - 64	166	25.06	17,249	732
65 -	16	23.14	17,663	768
	7186			

SCHEDULE VII

SUMMARY OF INACTIVE MEMBERS

Form of Payment	No. Of Lives	Average Age	Average Benefit
Normal Retirement	2,863	69	$260
Early Retirement	58	58	167
Disability	158	62	230
Spouse's Benefit	198	62	168
Child's Benefit	61	13	100
Total	3,338	67	$248
Tax-Sheltered Annuity	22	70	$ 68

COMMENTS

The System has recently converted its records to a fully computerized program. From an actuarial standpoint, we are pleased this conversion has taken place since statistical information can now be maintained with more detail. This will allow better comparisons in the future in determining the reasonableness of the actuarial assumptions. Also, the computerized records have allowed incomplete and inconsistent data to be readily detected which has led to more complete and accurate information.

In valuing any retirement system, a major consideration is the selection of the investment rate assumption. While there is no "right" investment rate, the selection should be based upon:

(1) the projected investment trends over a long period,
(2) the actual performance of the System's investment portfolio, and
(3) the amount of conservatism desired.

If too low an investment rate were assumed, the projected annual cost would increase, requiring present teachers and taxpayers to make excessive contributions. On the other hand, if the assumed rate were too high, future teachers and taxpayers would be required to subsidize the funds because of underfunding today. The original calculation of the Montana Teachers' Retirement System in 1971 was based upon an assumed rate of 5½%. At the request of the Board, this rate was increased to 6¼% in 1973. The net effect of this change was a decrease in the projected period over which the unfunded liability would be funded.

Clearly, the present and recent past performance of System's funds has exceeded 6¼%. If the Board elects to continue with the present assumption, we recommend that the Board's policy be such that a more conservative rate be selected if at any future date the economic indications predict a long-term decline in rates.

SUMMARY OF BENEFIT PROVISIONS

Vesting Period	5 years. No benefits are payable unless the member has a vested right.
Final Average Salary	Average of 3 highest consecutive years of earnings.
Normal Form of Benefits	Life only annuity. All benefits cease upon death; however, in no event will the member receive less than the amount of his personal contribution.
Normal Retirement Benefits	Minimum age 60; maximum age 70; Maximum service 30 years; however, credit is given for all service rendered prior to age 60. The retirement benefit is equal to one-sixtieth (1/60) of final average salary for each year of service. The minimum benefit is equal to one-sixtieth (1/60) of $4,800 for each year of service.
Early Retirement Benefits	Minimum age 50; the retirement benefit is calculated in the same manner as described for normal retirement but the monthly benefit is reduced ½ of 1% for each month the early retirement precedes age 60.
Death Benefits	The death benefit is equal to one-sixtieth (1/60) of final average salary for each year of service accrued at date of death with an actuarial adjustment based on the relation of the member's age at death to his beneficiary's age. In addition a child's benefit of $100/month is paid to each child under age 18 until he attains age 18.
Disability Benefits	The disability benefit is equal to one-sixtieth (1/60) of final average salary for each year of service accrued at date of disability. The minimum disability benefit is equal to one-quarter (¼) of the final average salary.

Withdrawal Benefits	With less than 5 years of service, the accumulated employee contributions are returned. With more than 5 years, the member may elect a refund of contributions or leave his contributions and retain a vested right to death and retirement benefits.
Tax-Deferred Annuities	The Teachers' Retirement System sponsors a tax-deferred annuity program for the benefit of its members. The policies of this program have been established in accordance with guidelines set by the Internal Revenue Service. The benefits provided by this program are determined solely by the value of the member's account (voluntary contributions plus interest) using actuarial tables approved by the Retirement Board.

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